

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

INOUE et al.

Art Unit: Unassigned

Application No.: Unassigned

Examiner: Unassigned

Filed: June 20, 2001

For: SEMICONDUCTOR
LASER EXCITATION
SOLID STATE LASER
APPARATUS

PRELIMINARY AMENDMENT

Commissioner for Patents
Washington, D.C. 20231

Dear Sir:

Prior to the examination of the above-identified patent application, please enter the following amendments and consider the following remarks.

IN THE CLAIMS:

Replace the indicated claims with:

1. (Amended) A semiconductor laser excitation solid state apparatus comprising:
a solid state laser element containing an active medium;
a semiconductor laser for optically exciting said solid state laser element;
a power supply for supplying electric power to said semiconductor laser; and
an optical resonator for producing a laser beam emitted from said optically excited solid state laser element, wherein, when said semiconductor laser is pulsed with a pulse of current to excite said solid state laser element, the current supplied to said solid state laser element is changed during the pulse.

2. (Amended) The semiconductor laser excitation solid state laser apparatus according to claim 1, wherein, when said semiconductor laser is pulsed with the pulse of current to excite said solid state laser element, the current supplied to said solid state laser element is decreased successively during the pulse.

3. (Amended) The semiconductor laser excitation solid state laser apparatus according to claim 1, wherein, when said semiconductor laser is pulsed with the pulse of current to excite said solid state laser element, the current supplied to said solid state laser element is decreased successively in an initial stage of a pulse during the pulse.

4. (Amended) The semiconductor laser excitation solid state laser apparatus according to claim 1, wherein, when said semiconductor laser is pulsed with the pulse of current to excite said solid state laser element, the current supplied to said solid state laser element is increased successively during the pulse.

5. (Amended) The semiconductor laser excitation solid state laser apparatus according to claim 1, wherein, when said semiconductor laser is pulsed with the pulse of current to excite said solid state laser element, the current supplied to said solid state laser element is increased successively in an initial stage of a pulse during the pulse.

6. (Amended) The semiconductor laser excitation solid state laser apparatus according to claim 1, wherein, when said semiconductor laser is pulsed with the pulse of current to excite said solid state laser element, the current supplied to said solid state laser element is changed stepwise during the pulse.

7. (Amended) The semiconductor laser excitation solid state laser apparatus according to claim 1, further comprising:

a diffusive reflector enclosing said solid state laser element and having an inner surface diffusing and reflecting the laser beam; and

an optical waveguide element for guiding the laser beam emitted from said semiconductor laser into said diffusive reflector while repeatedly totally reflecting the laser beam.

8. (Amended) The semiconductor laser excitation solid state laser apparatus according to claim 1 including a cooling plate and, wherein said solid state laser element has a rectangular cross section and is located on said cooling plate.

IN THE ABSTRACT:

Replace the Abstract with:

ABSTRACT OF THE DISCLOSURE

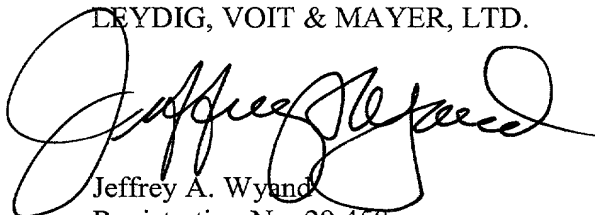
A solid state laser excited by a semiconductor laser is provided which can generate a stable and highly efficient high power laser beam. The laser apparatus includes a solid state laser element containing an active medium, a semiconductor laser for optically exciting the solid state laser element, a power supply for supplying electric power to the semiconductor laser, and an optical resonator for emission of a laser beam from the optically excited solid state laser element. When the semiconductor laser is pulsed to excite the solid state laser element, current supplied to the semiconductor laser is changed within a single pulse.

REMARKS

The foregoing Amendment corrects translational errors and conforms the claims to United States practice.

Respectfully submitted,

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**SPECIFICATION, CLAIMS AND
ABSTRACT AS PRELIMINARILY AMENDED**

Amendments to existing claims:

1. (Amended) A semiconductor laser excitation solid state apparatus comprising:
a solid state laser element containing an active medium;
a semiconductor laser for optically exciting said solid state laser element;
a power supply for supplying electric power to said semiconductor laser; and
an optical resonator for ~~taking out~~ producing a laser beam emitted from said
optically excited solid state laser element, wherein, when said semiconductor laser is
~~pulse-operated~~ pulsed with a pulse of current to pulse-excite ~~excite~~ said solid state laser
element, the current supplied to said solid state laser element is changed ~~within one~~
during the pulse.

2. (Amended) The semiconductor laser excitation solid state laser apparatus
according to claim 1, wherein, when said semiconductor laser is ~~pulse-operated~~ pulsed
with the pulse of current to pulse-excite ~~excite~~ said solid state laser element, the current
supplied to said solid state laser element is decreased successively ~~within one~~ during the
pulse.

3. (Amended) The semiconductor laser excitation solid state laser apparatus according to claim 1, wherein, when said semiconductor laser is ~~pulse-operated~~ pulsed with the pulse of current to ~~pulse-excite~~ excite said solid state laser element, the current supplied to said solid state laser element is decreased successively in an initial stage of a ~~pulse-within one~~ during the pulse.

4. (Amended) The semiconductor laser excitation solid state laser apparatus according to claim 1, wherein, when said semiconductor laser is ~~pulse-operated~~ pulsed with the pulse of current to ~~pulse-excite~~ excite said solid state laser element, the current supplied to said solid state laser element is increased successively ~~within one~~ during the pulse.

5. (Amended) The semiconductor laser excitation solid state laser apparatus according to claim 1, wherein, when said semiconductor laser is ~~pulse-operated~~ pulsed with the pulse of current to ~~pulse-excite~~ excite said solid state laser element, the current supplied to said solid state laser element is increased successively in an initial stage of a ~~pulse-within one~~ during the pulse.

6. (Amended) The semiconductor laser excitation solid state laser apparatus according to claim 1, wherein, when said semiconductor laser is ~~pulse-operated~~ pulsed with the pulse of current to ~~pulse-excite~~ excite said solid state laser element, the current supplied to said solid state laser element is changed stepwise ~~within one~~ during the pulse.

7. (Amended) The semiconductor laser excitation solid state laser apparatus according to claim 1, further comprising:

a diffusive reflector ~~arranged to enclose~~ enclosing said solid state laser element and having an inner surface ~~constructed to diffuse~~ diffusing and ~~reflect~~ reflecting the laser beam; and

an optical waveguide element for guiding the laser beam emitted from said semiconductor laser into the interior of said diffusive reflector while ~~repeating totally reflections of~~ repeatedly totally reflecting the laser beam.

8. (Amended) The semiconductor laser excitation solid state laser apparatus according to claim 1 including a cooling plate and, wherein said solid state laser element has a ~~rectangle~~ rectangular cross section and is ~~arranged~~ located on a said cooling plate.

Amendments to the abstract:

ABSTRACT OF THE DISCLOSURE

~~A semiconductor laser excitation solid state laser apparatus excited by a semiconductor laser~~ is provided which can generate a stable and highly efficient high power laser beam ~~of high power~~. The laser apparatus includes a solid state laser element ~~2~~ containing an active medium, a semiconductor laser ~~1~~ for optically exciting the ~~semiconductor solid state laser 1 element~~, a power supply ~~8~~ for supplying electric power to the semiconductor laser ~~1~~, and an optical resonator ~~9, 10~~ for ~~taking out~~ emission of a laser beam from the optically excited solid state laser element ~~2~~. When the semiconductor laser ~~1~~ is ~~pulse-operated~~ pulsed to ~~pulse-excite~~ excite the solid state laser element ~~2~~, current supplied to the semiconductor laser ~~1~~ is changed within ~~one~~ a single pulse.

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CLAIMS PENDING AFTER PRELIMINARY AMENDMENT

1. A semiconductor laser excitation solid state apparatus comprising:
a solid state laser element containing an active medium;
a semiconductor laser for optically exciting said solid state laser element;
a power supply for supplying electric power to said semiconductor laser; and
an optical resonator for producing a laser beam emitted from said optically excited solid state laser element, wherein, when said semiconductor laser is pulsed with a pulse of current to excite said solid state laser element, the current supplied to said solid state laser element is changed during the pulse.
2. The semiconductor laser excitation solid state laser apparatus according to claim 1, wherein, when said semiconductor laser is pulsed with the pulse of current to excite said solid state laser element, the current supplied to said solid state laser element is decreased successively during the pulse.
3. The semiconductor laser excitation solid state laser apparatus according to claim 1, wherein, when said semiconductor laser is pulsed with the pulse of current to excite said solid state laser element, the current supplied to said solid state laser element is decreased successively in an initial stage of a pulse during the pulse.

4. The semiconductor laser excitation solid state laser apparatus according to claim 1, wherein, when said semiconductor laser is pulsed with the pulse of current to excite said solid state laser element, the current supplied to said solid state laser element is increased successively during the pulse.

5. The semiconductor laser excitation solid state laser apparatus according to claim 1, wherein, when said semiconductor laser is pulsed with the pulse of current to excite said solid state laser element, the current supplied to said solid state laser element is increased successively in an initial stage of a pulse during the pulse.

6. The semiconductor laser excitation solid state laser apparatus according to claim 1, wherein, when said semiconductor laser is pulsed with the pulse of current to excite said solid state laser element, the current supplied to said solid state laser element is changed stepwise during the pulse.

7. The semiconductor laser excitation solid state laser apparatus according to claim 1, further comprising:

a diffusive reflector enclosing said solid state laser element and having an inner surface diffusing and reflecting the laser beam; and

an optical waveguide element for guiding the laser beam emitted from said semiconductor laser into said diffusive reflector while repeatedly totally reflecting the laser beam.

8. The semiconductor laser excitation solid state laser apparatus according to claim 1 including a cooling plate and, wherein said solid state laser element has a rectangular cross section and is located on said cooling plate.